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NOTES ON SOME NORTH AMERICAN TEPHRITIDAE,
WITH DESCRIPTIONS OF TWO NEW GENERA
AND TWO NEW SPECIES
(DIPTERA)

BY RICHARD H. FOOTE

*Entomology Research Division, ARS, U. S. Department of
Agriculture, Washington, D. C.*

This paper comprises some notes and descriptions accumulated during a compilation of a definitive catalog of North American Tephritidae. Included are the descriptions of *Metatephritis fenestrata*, n. gen., n. sp.; the genus *Mylogymnocarena*, n. gen., for *Urellia apicata* Thomas; and *Gymnocarena bicolor*, n. sp. *Eutreta aurantiaca* Doane is placed in the genus *Xenochaeta*; a first United States record for *Acrotaenia testudinea* (Lw.) is given; and the genera *Gymnocarena*, *Oedicaeno*, and *Zonosemata* are discussed.

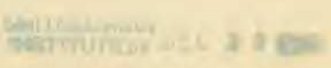
Assistance was received from M. T. James, Washington State University, Pullman; R. B. Lattimore and E. W. Jackson, U. S. Department of Agriculture, Brownsville, Texas; C. W. Sabrosky, U. S. Department of Agriculture, Washington, D. C.; and H. V. Weems, Jr., State Plant Board of Florida, Gainesville. The collections of the Museum of Comparative Zoology, Cambridge, Massachusetts, and the U. S. National Museum were indispensable.

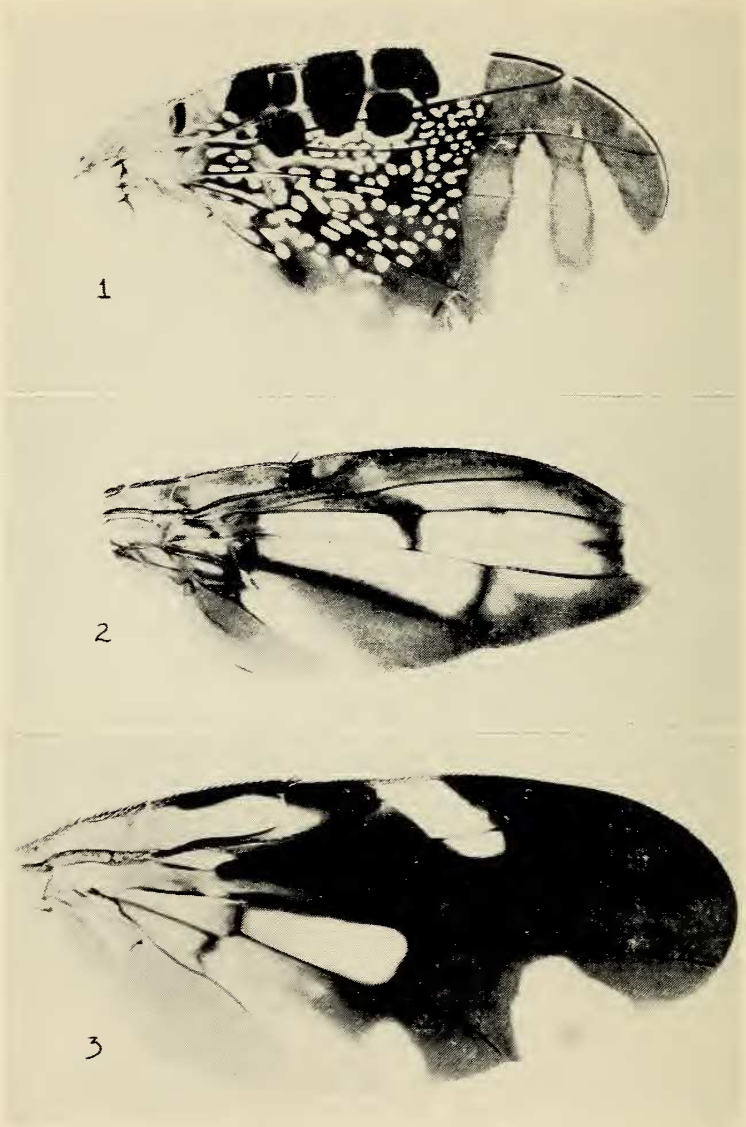
Acrotaenia testudinea (Loew)

(Fig. 1)

Trypeta testudinea Loew, 1873, Smiths. Misc. Coll. 11(256): 272; pl. XI, Fig. 13.

Acrotaenia testudinea: Loew, 1873, Smiths. Misc. Coll. 11(256): 274.—Hendel, 1914, Abh. u. Ber. Anthrop.-Ethn. Mus. Dresden (1912) 14: 59.—Bates, 1933, Bull. Brooklyn Ent. Soc. 28: 164.—Bates, 1934, Rev. de Ent. 4: 9.—Aezél, 1949, Acta Zool. Lilloana 7: 269.





FIGS. 1-3

A female of this species was collected 26 January 1936, on Big Pine Key, Monroe Co., Florida, by T. J. Cooper in a glass McPhail fruit fly trap. The specimen has been assigned Florida State Plant Board Acces-

sion No. 58178 and is deposited in the collection of that organization at Gainesville. This constitutes the first United States record of the genus and species, and is the only one known to me. It is significant that this fruit fly has never been recorded from the United States since 1936 despite the large number of traps used in the extensive Florida fruit fly survey conducted during and after the 1956-1957 Medfly outbreak.

The type locality of *testudinea* is stated by Loew (1873) as Cuba; the specimen is in the Berlin Museum. The species has been reported from Cuba and Puerto Rico several times, and specimens in the U. S. National Museum represent several localities on each of these islands. The National Museum also contains a specimen bearing the label "Jacaqua, Dominican Republic."

The wing illustrated in Figure 1 is that of a Puerto Rican female.

Xenochaeta aurantiaca (Doane), new combination

Eutreta aurantiaca Doane, 1899, Jour. New York Ent. Soc. 7: 185; pl. III, Fig. 10.—Aldrich, 1905, Smiths. Misc. Coll. 46(1444): 608.

Tephritis aurantiaca: Coquillett, 1899, Jour. New York Ent. Soc. 7: 264.

Through the courtesy of Maurice T. James, I have been able to examine the holotype of *aurantiaca* Doane. This female is headless and has but one wing, but is otherwise intact. Although the hyaline spots in the wing of *aurantiaca* are smaller, much more discrete, and separated from each other by greater distances than in *dichromata* Snow, the only other species in the genus, the general pattern of spotting, as illustrated by Doane (1899), is similar. Both species have a shiny yellow abdominal dorsum with large, dark, partially or completely confluent spots covered by mixed black and yellow setae; the mesonotum covered by some pollinosity and dense reddish or yellowish hairs; the dorsal one-third of the thoracic pleural area with a light yellow stripe that includes the humerus and prothoracic spiracle; and shining black postscutellum and metathorax. An intact specimen of *aurantiaca* from Fort Lewis, Washington, collected by Paul H. Arnaud, Jr., has a sharply pointed third antennal segment, much more so than in *dichromata*. The arrangement of the three lower fronto-orbitals in both species is distinctive; the anterior two are situated close to each other near the antennal bases, and the posterior one is considerably removed from them and in a transverse line with the anterior pair of uppers. The front at the vertex is very wide. The two species may be distinguished from each other by the following key:

Wing pattern consisting of small, discrete, hyaline spots; one small dark mid-ventral spot on each femur; dark spots fused, or nearly so, on all but basal abdominal tergum; scutellum dark basally and centrally, yellow laterally *aurantiaca* (Doane)

Wing pattern consisting of large, diffuse hyaline spots; only hind femur with one dark mid-ventral spot, remaining femora entirely yellow; dark spots not fused on any but terminal abdom-

inal tergum; scutellum with dark area only at base of each
bristle *dichromata* Snow

The genera *Paracantha* Coquillett, *Eutreta* Loew, *Eurosta* Loew, *Icteric* Loew, *Xanthomyia* Phillips, *Jamesomyia* Quisenberry, and *Acidogona* Loew belong with *Xenochaeta* in the tribe Ditrichini of the subfamily Tephritinae, as outlined in Hering's (1947) detailed key to the suprageneric groups of the family. These genera are characterized by having a wide frons with the upper fronto-orbitals set well inside the lowers, the dorsocentrals in a transverse line through the supra-alars, the wing pattern consisting essentially of light spots on a dark field, and well-defined marks forming a pattern on a light colored abdominal dorsum. These genera, including *Xenochaeta*, have dark spots on one or more pairs of femora or possess partially or entirely dark femora, and all have yellow postocular bristles. From the first five genera named above, *Xenochaeta* may be distinguished by the very different wing pattern, and from *Icteric* and *Acidogona* by the much smaller size of its species. *Xanthomyia* and *Jamesomyia* are heavily pollinose species with very stout head hairs; the former genus carries only two pairs of lower fronto-orbitals and has a very broad wing with the hyaline spots of the pattern very differently disposed than those of *Xenochaeta*.

Metatephritis, new genus

Diagnosis: Labellum normal in size and shape, not elongate or geniculate; face somewhat produced anteriorly at oral margin; frons at vertex as wide as one eye; from lateral view, gena less than one-half the maximum eye height; third segment of antenna rounded apically; three pairs well-developed lower fronto-orbitals; two pairs upper fronto-orbitals, the posterior pair very light colored and not convergent; post-oculars pale and blunt. Humeral and supra-alars present; one pair dorsocentrals situated immediately behind suture and distinctly anterior to anterior supra-alars; two pairs scutellar.

Type species: *Metatephritis fenestrata*, new species.

Metatephritis fenestrata, new species

(Fig. 2)

Male: In lateral view head 1.3 times as high as long; frons and proximal half of face flat, meeting at an angle of about 120 degrees; gena narrow, 0.1 to 0.15 times as high as one eye; lower fronto-orbitals strongly curved inwardly; ocellar longer than any other head bristle except inner vertical; genal bristle situated directly under eye; antenna about 0.5 times as long as face, entirely yellow.

Mesonotum yellow with indistinctly margined brown marking occupying a narrow area behind head and extending posteriorly to suture on each side of a central yellowish spot situated immediately anterior to suture, and occupying most of notum from suture to scuto-scutellar suture; scutellum entirely yellow, the posterior bristles crossed; entire

postscutellum and median two-thirds of metathorax brown, this spot with indistinct margins; remainder of thorax, including halter and legs, yellow. Wing pattern as in Fig. 2; vein R_{4+5} and node entirely bare; cell 1st A distally extending into a distinct point; vein r-m distinctly distad of midpoint of cell 1st M_2 .

Abdomen yellow above and below; setae on dorsum of segment I yellow, those on dorsal terga of remaining segments brown; claspers with black apical and subapical teeth, the latter very long and slender; remainder of genitalia yellow.

Wing length: 7 mm.

Female: Not known.

Types: Holotype ♂, North Side, Buffalo Bill Reservoir, near Cody, Wyoming (no further data available). U. S. National Museum No. 64871. Paratypes: 1 ♂, same data as type (USNM); 1 ♂, Boundrant, Wyoming, 13 June 1958, in gall of *Artemisia tridentata* (Fronk) (USNM).

Discussion: The unusual wing pattern sets *fenestrata* apart morphologically from all North American tephritids; the species may be recognized immediately by the brown border completely surrounding the wing field, thereby forming a central hyaline area occupying most of cells R, R_5 , and 1st M_2 .

The genus belongs in the typical tribe of the subfamily Tephritinae, as outlined in Hering's extensive key (1947), but is placed there with difficulty because of the absence of hyaline spots in a dark field. The remaining characters are so like those of *Neotephritis* Hendel and *Euarestoides* Benjamin that the genus would be improperly placed elsewhere in the family. Both *Euarestoides* and *Neotephritis* have been reviewed by Foote (1958 and 1960, respectively).

Mylogymnocarena, new genus

Diagnosis: Frons bare, about as wide as one eye at vertex; in profile gena broad and without well-developed bristles anterior to genal bristle; face retreating, without median carina, oral margin not produced anteriorly; holotype with 4 lower fronto-orbitals on one side, 5 on the other; 2 pairs upper fronto-orbitals, the posterior pair not convergent; postoculars pale; antenna about two-thirds as long as face, third segment rounded apically. Humeral, supra-alar, and presutural present; 1 pair dorsocentrals, in a line drawn between anterior supra-alars; 2 pairs scutellars. Femora without stiff short setae ventrolaterally. Vein r-m situated distinctly apical of midpoint of cell 1st M_2 ; vein R_{4+5} bristled dorsally.

Type species: *Urellia apicata* Thomas.

Mylogymnocarena apicata (Thomas), new combination

Urellia apicata Thomas, 1914, Canadian Ent. 46: 428; Fig. 35.

The original description of Thomas (1914) places this rare species very well. As far as known, the holotype is the only existing specimen. This female is in the Museum of Comparative Zoology, Cambridge, Mas-

sachusetts, and bears the following labels: "Colo 2277," "Urellia apicata Th.," "Holotype No.," and "Type 7731."

The wing pattern of *apicata* indicates an affinity with *Trupanea*, from which it differs by the presence of setae on vein R_{4+5} , the more posterior position of the dorsocentrals, and the larger number of lower fronto-orbitals. The characters of *apicata* do not allow its placement in any of the known tephritid genera.

Genus *Gymnocarena* Hering

Gymnocarena Hering, 1940, *Siruna Seva* 1: 4.

The genus *Oedicarena* was established by Loew in 1873 (see below) for *tetanops*, n. sp., a yellowish Mexican species with a wing pattern very much like *Rhagoletis basiola* (O.S.) and *Zonosema vittigera* (Coq.) but having a prominent facial carina arising between the bases of the antennae and extending to the oral margin. In 1877 Osten Sacken described *Oedicarena persuasa* from Denver, Colorado, and in 1894 Snow placed his new species *diffusa* in *Oedicarena*. The genus as thus constituted caused considerable confusion among tephritid taxonomists, a situation aggravated by the lack of an adequate generic position for *tricolor* Doane, 1899, originally described as an *Euaesta* but closely related to *diffusa* and quite different from *tetanops* and *persuasa*.

Hering (1940) effectively resolved the confusion by establishing *Gymnocarena* for *diffusa*, and Quisenberry (1950) assigned *tricolor* to it. A single specimen in the U. S. National Museum represents yet a third species and is described below as *bicolor*, n. sp.

Generic diagnosis: Frons bare; gena directly below eye distinctly less than one-half the eye height; proboscis not geniculate; face without carina; three pairs lower fronto-orbitals; two pairs upper fronto-orbitals, the posterior pair not convergent; postoculars pale but slender and pointed; third antennal segment rounded apically. Humeral, supra-alar, and postsutural present; 1 pair dorsocentrals, situated in a transverse line between anterior supra-alars; vein r-m distinctly apicad of midpoint of cell 1st M_2 .

KEY TO KNOWN SPECIES OF GYMNOCARENA HERING

1. Wing pattern with an almost continuous transverse hyaline band between costa and posterior margin of cell Cu_1 , in addition to other hyaline markings *diffusa* (Snow)
Wing pattern without such a continuous band, although other markings are present 2
2. Cell R_1 with two hyaline marks distad of apex of stigma; wing field consisting of two distinctly different shades of brown, one anterior and one posterior to veins M and M_{1+2} *tricolor* (Doane)
Cell R_1 with one hyaline mark distad of apex of stigma; wing field unicolorous *bicolor*, n. sp.

Gymnocarena diffusa (Snow)

Oedicarena diffusa Snow, 1894, Kansas Univ. Quart. 2: 161; pl. VII, Fig. 9.—Doane, 1899, Jour. New York Ent. Soc. 7: 179.—Curran, 1934, Fam. Gen. North American Dipt., p. 290; Fig. 30.

Straussia diffusa: Coquillett, 1899, Jour. New York Ent. Soc. 7: 261.

Strauzia diffusa [sic]: Cresson, 1907, Trans. American Ent. Soc. 33: 100.

Gymnocarena diffusa: Hering, 1940, Siruna Seva 1: 4.

The wing of this species has been excellently illustrated by Curran (1934), and is distinctive in having an almost continuous transverse hyaline band from the costa to the posterior margin of the wing in cell Cu_1 in addition to a number of other hyaline markings. The field color is such a light shade of brown in some specimens that the pattern of hyaline markings is difficult to distinguish.

The species inhabits the Great Plains region of the United States. The eastern limit of its range is Missouri, the northernmost record is Montana; the species extends into the southwest as far as Arizona. Although *diffusa* is a rather common species, nothing is known about its larval habitat.

Gymnocarena tricolor (Doane)

Euaresta tricolor Doane, 1899, Jour. New York Ent. Soc. 7: 191; pl. IV, Fig. 9.—Aldrich, 1905, Smiths. Misc. Coll. 46(1444): 613.

Tephritis tricolor: Coquillett, 1899, Jour. New York Ent. Soc. 7: 264.

Gymnocarena tricolor: Quisenberry, 1950, Jour. New York Ent. Soc. 58: 10.

Doane's (1899) description and wing figure are quite sufficient to place this little-known species. The wing pattern consists of clear hyaline spots on a field of two contrasting shades of brown distinctly divided from each other along veins M and M_{1+2} , the dark shade lying anterior and the light shade posterior to this line.

The species was originally described from South Dakota. The only cabinet specimen other than the holotype is in the U. S. National Museum and bears the label "Cranmoor, Wis., VIII.16.09."

Gymnocarena bicolor, new species

(Fig. 3)

Male: Frons yellow, parallel-sided, 0.8 times as wide as one eye at vertex; in lateral view, head 1.4 times as high as long; gena directly below eye 0.2 times as high as eye; face whitish, produced anteriorly at oral margin; antenna 0.8 times as long as face. Mesonotum yellow with fine yellow setae in addition to the larger bristles; thorax without dark markings of any kind; scutellum with 4 bristles; head and thoracic bristles light brown. Wing pattern as in Fig. 3; vein R_{2+3} haired nearly to apex; vein r-m situated distad of apex of stigma, distad of mid-point of cell 1st M_2 , and at a distinct angle to vein m; cell 1st A drawn to a point along vein $Cu_2 + 2nd A$. Legs and abdomen completely yellow, without dark markings.

Wing length: 9 mm.

Holotype: ♂, Indian Creek Canyon, Chiricahua Mountains, Arizona, 6100 ft. U. S. National Museum Type No. 64872.

Discussion: In addition to the characters given in the generic description, the wing figures and key adequately characterize this species. It is easily separable from *tricolor* by the even brown color of the wing field and the different arrangement of hyaline spots as shown.

Genus *Oedicarena* Loew

Oedicarena Loew, 1873, *Smiths. Misc. Coll.* 11(256): 247. Type species *tetanops* Loew (*ibid.*, p. 245, pl. XI, Fig. 15).

A discussion of the history of this genus will be found under the treatment of *Gymnocarena* in the present paper. The species of *Oedicarena* differ markedly from those of *Gymnocarena* in possessing a prominent facial carina, a gena at least as high as one-half the eye height, golden mesonotal pollen, and the dorsocentrals situated very close to the acrosticals. *Oedicarena* very closely resembles *Rhagoletoides* Foote (1960) in having a prominent facial carina, golden mesonotal pollen, and a suggestion of paired brown mesonotal spots, but differs from that genus in lacking strong femoral spines and a narrow gena.

The two species now comprising *Oedicarena*, *tetanops* (Lw.) and *persuasa* (O.S.), are represented by holotypes in the Museum of Comparative Zoology. They may be recognized by the following characters:

1. Cells 1st and 2nd C, basal half of cell R, and cell 1st A yellow;
brown spot in apex of cell R₅ continuous along costa with
transverse band covering vein m *persuasa* (O.S.)
- Cells 1st and 2nd C, basal half of cell R, and cell 1st A hyaline;
brown spot in apex of cell R₅ isolated *tetanops* (Lw.)

O. persuasa was originally described from Denver, Colorado, and has not been recorded since; *tetanops*, as far as known, occurs only in Mexico and has not been captured within the United States.

Genus *Zonosemata* Benjamin

(Fig. 4)

Zonosemata Benjamin, 1934, U. S. Dept. Agric. Tech. Bull. 401: 17.
Type species: *Trypeta electa* Say.

The diagnosis and a discussion of this close ally of *Rhagoletis* Loew are detailed by Benjamin (1934). *Zonosemata* is a North American genus containing two species, *electa* (Say), the pepper maggot, and *vittigera* (Coq.). A short but excellent summary of the distribution, hosts, and economic importance of *electa* is already available (Anon, 1959), and a more detailed account is given by Benjamin (1934). *Z. vittigera*, however, has been generally overlooked in discussions of the genus.

Adults of *vittigera* have been collected from alfalfa, cotton, *Helianthus* spp., orange, peach, and quince and are commonly attracted to traps baited for the Mexican fruit fly (*Anastrepha ludens* (Lw.)) in the Rio

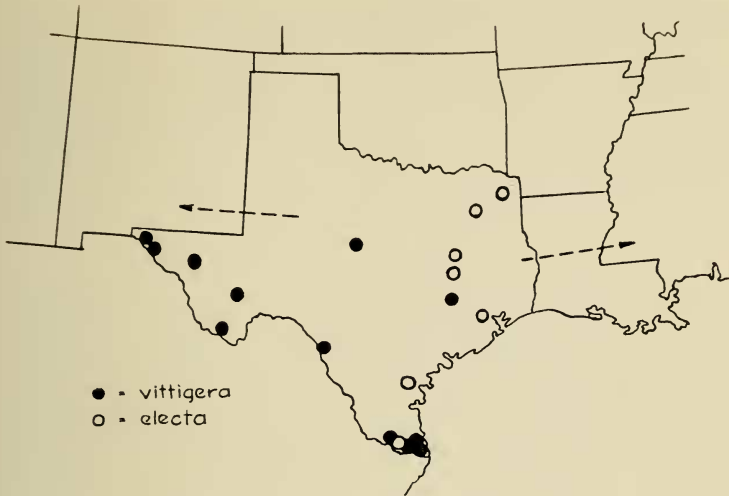


FIG. 4

Grande valley of Texas. However, the only plant authenticated as a larval habitat is *Solanum eleagnifolium*, the silverleaf or white horse-nettle. This plant is found in dry, open woods, prairies, waste places and disturbed soil in southwestern United States and adjacent Mexico; the northern limit of its range is in Missouri, and the plant has been found occasionally in Louisiana, Ohio, and Florida (Fernald, 1950). This distribution agrees well with that of *vittigera*, based on specimens seen in this study from the following localities:

UNITED STATES. ARIZONA: Amado, Aura Valley, Benson, Buckeye, Douglas, Ft. Apache, Lavern, Mesa, Nogales, Pearce, Sedona, White River, and Wilcox. NEW MEXICO: Belen, Las Cruces, Mesilla, Rodeo, and 7 mi southeast of Rodeo. CALIFORNIA: A single female captured in Santa Fe R.R. Pullman, San Francisco (1929). TEXAS: Brownsville, Bryan, Coleman, Donna, Eagle Pass, El Paso, Ft. Davis, Harlingen, Pine Springs, Presidio, and Weslaco (all shown on map, Fig. 4). MEXICO. TAMAULIPAS: Matamores and Reynosa.

Figure 4 is based only on specimens seen in this study and shows the limited area in which the ranges of *vittigera* and *electa* overlap. No intergrading characters in any of the Texas specimens of either species could be found.

The mesonota of both species are yellow laterally and centrally and have wide, paired, sublateral brown stripes which are united anteriorly but divided posterior to the suture. In *vittigera* these stripes are united by a dark transverse streak at the base of the scutellum; this mark is usually absent in *electa*. In addition, *vittigera* has paired sublateral black

spots anterior to the mesonotal suture, much of the post-scutellum is black, the metanotum has paired lateral black stripes, and black spots are present in the center of the thoracic pleural area and on the sternopleuron centrally, characters never present in *electa*. The wing bands of *vittigera* are narrower and more sharply defined, although their arrangement is nearly the same in the two species. Few external structural differences distinguish them from each other, but the aedeagus of *vittigera* is narrower in proportion to its width (2:6) than that of *electa* (2:5), a reliable means for separating them.

LITERATURE CITED

- Anonymous. 1959. Status of some important insects in the United States. Pepper maggot (*Zonosemata electa* (Say)). U. S. Dept. Agr., Agr. Res. Serv., Coop. Econ. Insect Rept. 9: 721-722, illus.
- Benjamin, F. H. 1934. Descriptions of some native trypetid flies with notes on their habits. U. S. Dept. Agr. Tech. Bull. 401, 95 pp., illus.
- Curran, C. H. 1934. The families and genera of North American Diptera. 512 pp., illus. Privately printed.
- Doane, R. W. 1899. Notes on Trypetidae with descriptions of new species. Jour. New York Ent. Soc. 7: 177-193, illus.
- Fernald, M. L. 1950. Gray's Manual of Botany. 8th ed., 1632 pp., illus. American Book Co., New York, N. Y.
- Foote, R. H. 1958. The genus *Euaestoides* in the United States and Mexico. Ann. Ent. Soc. America 51: 288-293.
- . 1960. A new tephritid genus, *Rhagoletoides*, with notes on its distribution and systematic position. Ent. News, 71: 145-149, illus.
- . 19... The species of the genus *Neotephritis* Hendel in America North of Mexico. Jour. New York Ent. Soc. (in press).
- Hering, E. M. 1940. Neue Arten und Gattungen. Siruna Seva 1: 1-16, illus.
- . 1947. Bestimmungstabelle der Unterfamilien und Tribus der Trypetidae. Siruna Seva 6: 12-16.
- Loew, H. 1873. Monographs of the Diptera of North America. Part III. Review of the North American Trypetina. Simths. Misc. Coll. 11 (256): 211-351, illus.
- Quisenberry, B. F. 1950. The genus *Euaesta* in the United States. Jour. New York Ent. Soc. 58: 9-38, illus.
- Thomas, F. L. 1914. Three new species of Trypetidae from Colorado. Canadian Ent. 46: 425-428, illus.

EXPLANATION OF FIGURES

Right wing, dorsal view, Tephritidae. Fig. 1, *Acrotaenia testudinea*

(Lw.); Fig. 2, *Metatephritis fenestrata*, n. gen., n. sp.; Fig. 3, *Gymnocarena bicolor*, n. sp.

Fig. 4. Distribution of *Zonosemata electa* and *Z. vittigera* in Texas. Arrows indicate approximate direction of additional locality records (left, *vittigera*; right, *electa*).